



## A Simple Method for Reducing Cigarette Caused Upholstery Fires

One of the best kept secrets in the upholstery industry is that clean cellulosic fabrics do not ignite from cigarettes. It is generally thought that cigarette ignition resistance of cellulosic fabrics decreases with increasing fabric weight. However, even such heavy cotton fabrics as Haitian cotton will not ignite by cigarettes if rinsed in deionized or low hardness water.

Only cellulosic fabrics which contain certain compounds—primarily alkali metal ions such as potassium, sodium or calcium—support smoldering ignition. Such ions are found naturally in raw cotton (which is used in many upholstery fabrics) or as residues of dye assistants, softeners, detergents, etc.

The effect of many compounds on smoldering in general has been discussed (1-3). Others have shown in detail how increase in alkali metal ion concentration decreases cigarette ignition resistance of fabrics and the minimum concentration necessary to cause cigarette ignition and continued smoldering of fabric/foam combinations (4-6). Smolder promoters used to be added to cigarette tobacco to keep cigarettes burning while not puffed, but modern fertilization practices obviated the need for such additives. However, the smoldering rate and ash appearance of cigarette paper is modified by addition of, for example, sodium and potassium nitrate (7). Other tobacco smoldering promoters and inhibitors have been studied experimentally (8).

A simple test could be carried out by furniture and fabric manufacturers: a sample of a cellulosic upholstery fabric is rinsed in deionized or soft water, allowed to dry thoroughly and used in a fabric/foam mockup. A similar mockup is made from unrinsed fabric, and their reaction to ignited cigarettes observed. If there is considerably less smoldering of the rinsed mockup, a modification of the finishing process would be indicated.

There appear to be several thus far overlooked opportunities:

- For upholstered furniture manufacturers: to have a much wider selection of cigarette ignition resistant fabrics—e.g., UFAC Class 1 as compared to Class 2—with little or no added cost.

cigarette ignition resistance which may be a merchandising advantage as well as reducing cigarette caused fire death incidents.

- For finishing manufacturers: to offer new products—e.g., dye assistants, softeners, etc.—which promote smoldering less so they would not have to be completely rinsed out. Others could contain smolder inhibitors (to be used, perhaps, in the backcoating of raw cotton fabrics) which are not wet finished and for which rinsing and drying would be a costly production step. Boric acid/borax smolder inhibitors are widely used, of course, in cotton batting for both cigarette and flame ignition resistance, and others are available (1-3).

- For suppliers of upholstery cleaning materials: to offer products with reduced tendency to smolder, and to counteract rinses.

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